Name:

at1124exam: Radicals and Squares (v809)

Question 1

Simplify the radical expressions.

$\sqrt{28}$	$\sqrt{27}$	$\sqrt{8}$
$\sqrt{2 \cdot 2 \cdot 7}$	$\sqrt{3 \cdot 3 \cdot 3}$	$\sqrt{2 \cdot 2 \cdot 2}$
$2\sqrt{7}$	$3\sqrt{3}$	$2\sqrt{2}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+5)^2}{2} + 3 \;=\; 35$$

First, subtract 3 from both sides.

$$\frac{(x+5)^2}{2} = 32$$

Then, multiply both sides by 2.

$$(x+5)^2 = 64$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 5 = \pm 8$$

Subtract 5 from both sides.

$$x = -5 \pm 8$$

So the two solutions are $x = 3$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = 39$$

$$x^2 + 10x + 25 = 39 + 25$$
$$x^2 + 10x + 25 = 64$$
$$(x+5)^2 = 64$$
$$x + 5 = \pm 8$$
$$x = -5 \pm 8$$
$$x = 3 \quad \text{or} \quad x = -13$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 - 30x + 81$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 - 10x) + 81$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 - 10x + 25 - 25) + 81$$

Factor the perfect-square trinomial.

$$y = 3((x-5)^2 - 25) + 81$$

Distribute the 3.

$$y = 3(x-5)^2 - 75 + 81$$

Combine the constants to get **vertex form**:

$$y = 3(x-5)^2 + 6$$

The vertex is at point $(5, 6)$.